

WO 2004/111934

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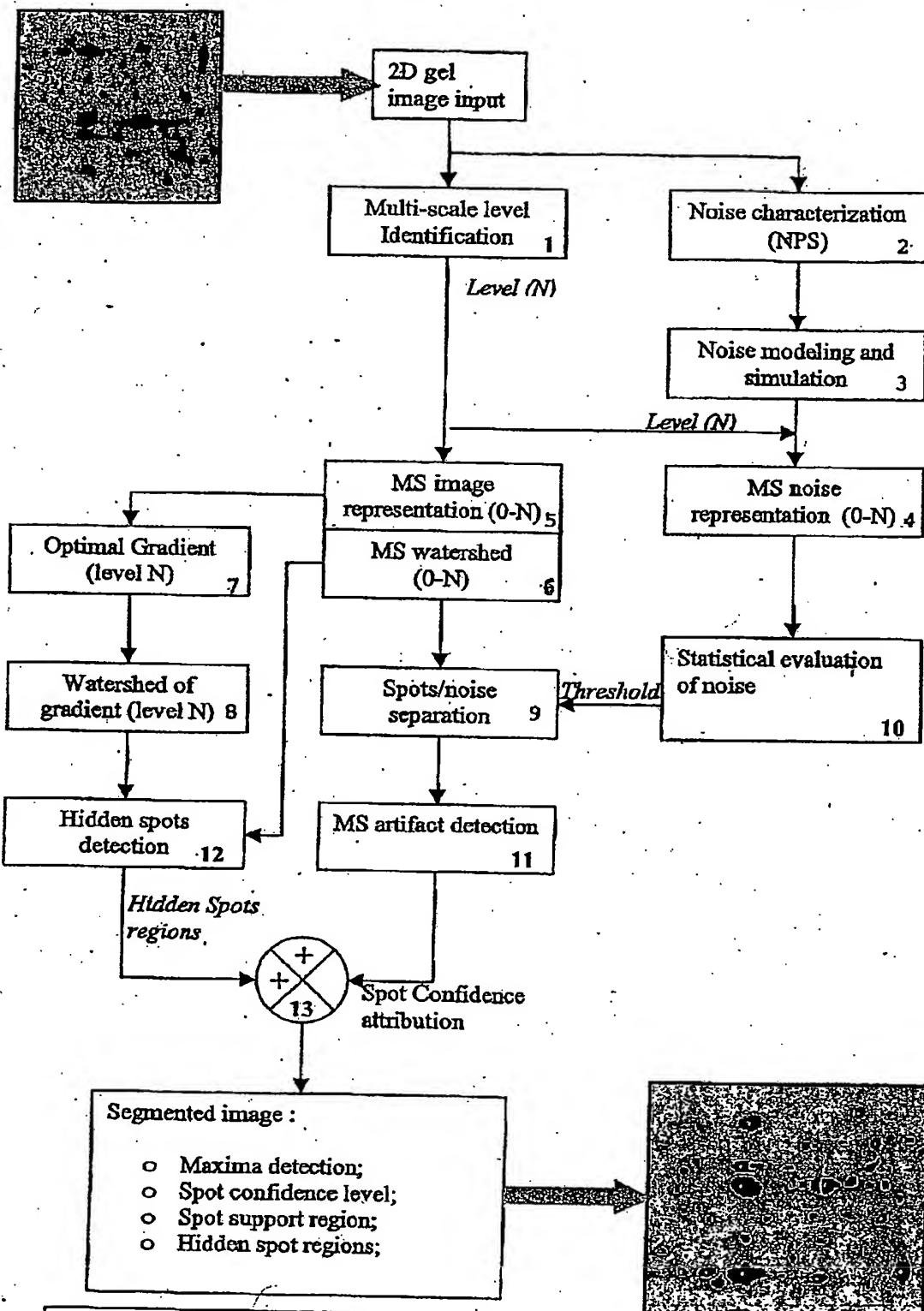


Figure 1: overall image analysis method

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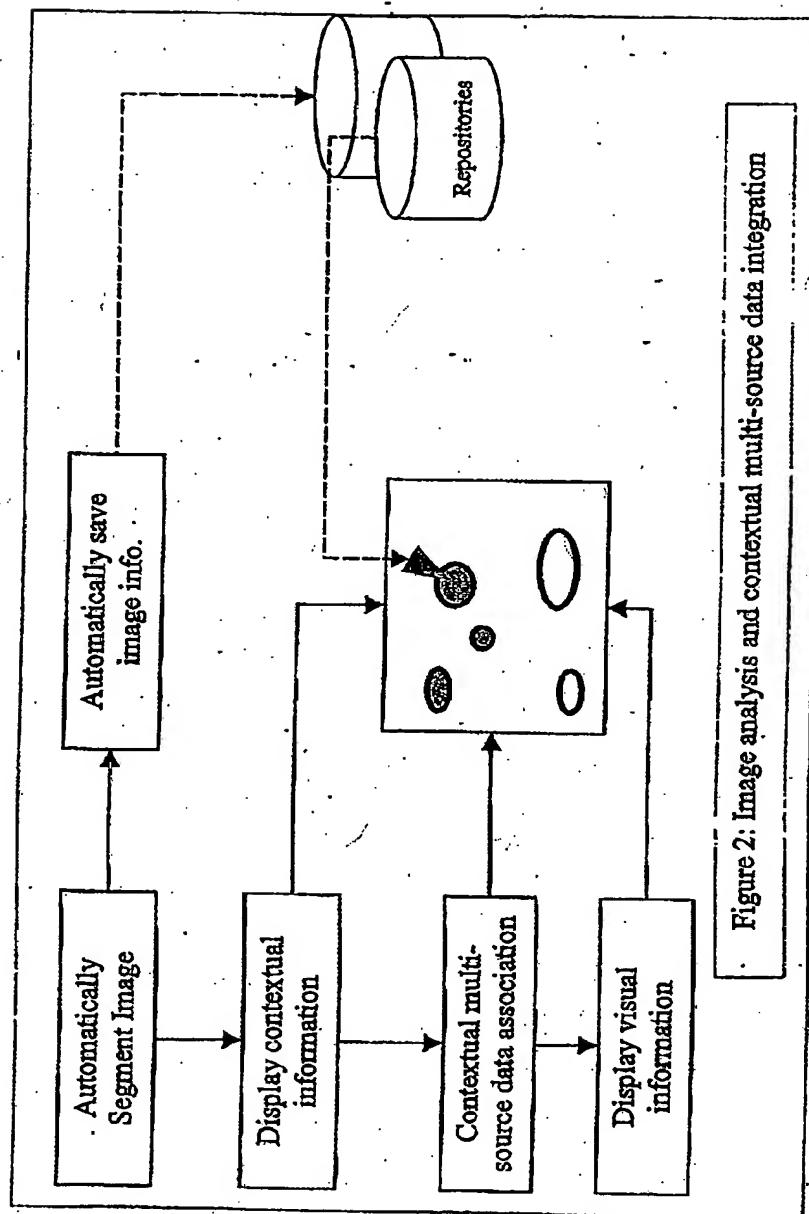


Figure 2: Image analysis and contextual multi-source data integration

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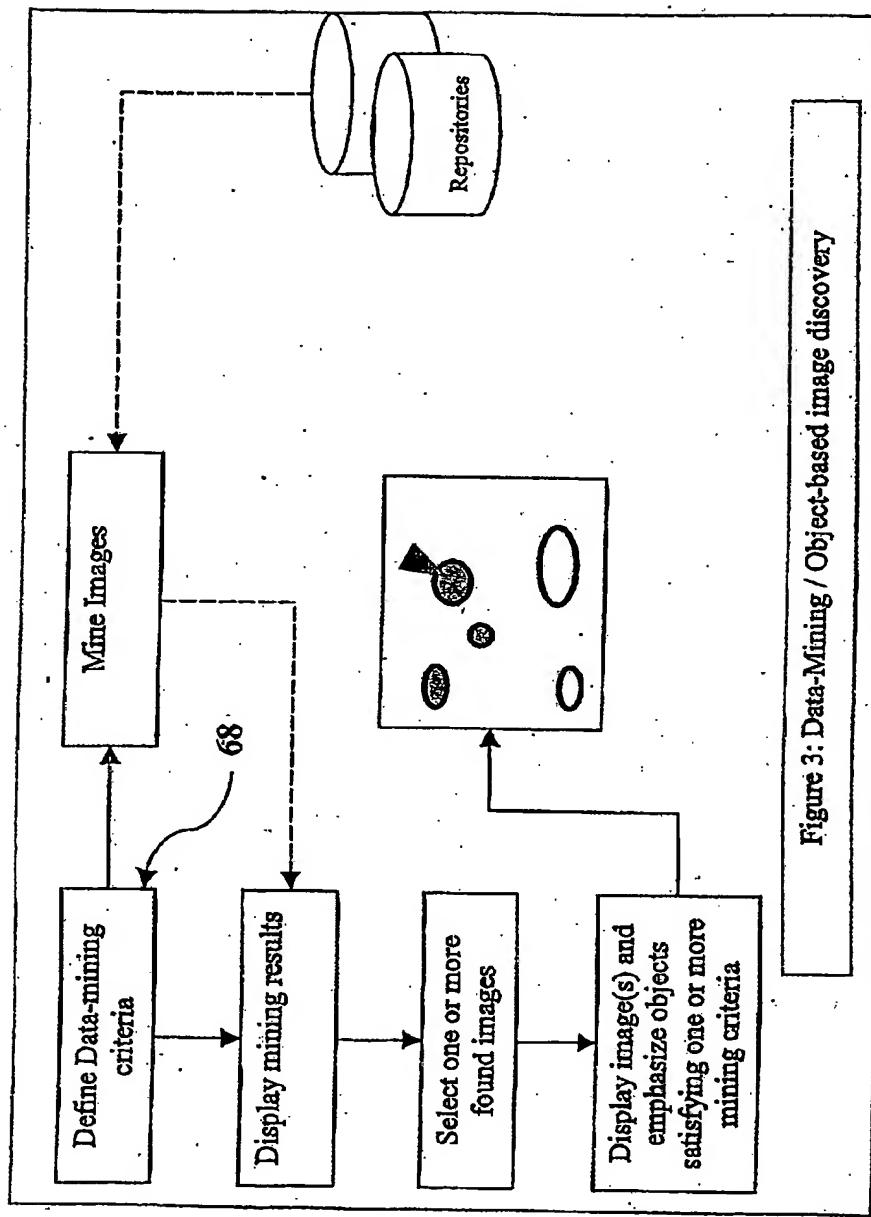
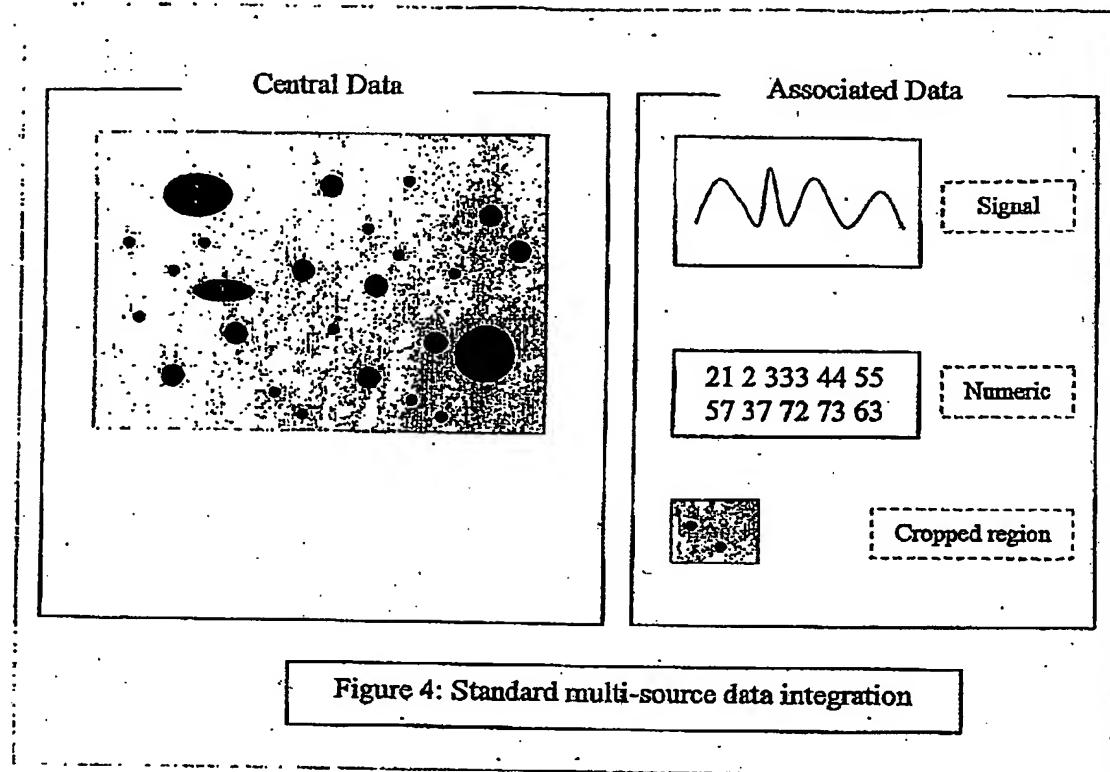


Figure 3: Data-Mining / Object-based image discovery

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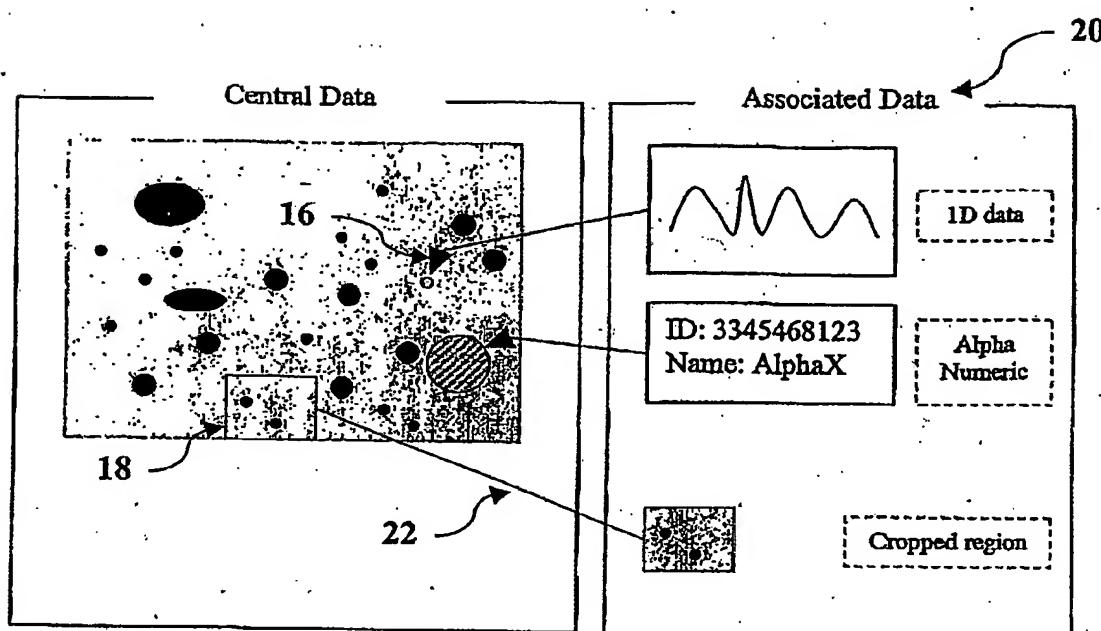


Figure 5: contextual multi-source data integration

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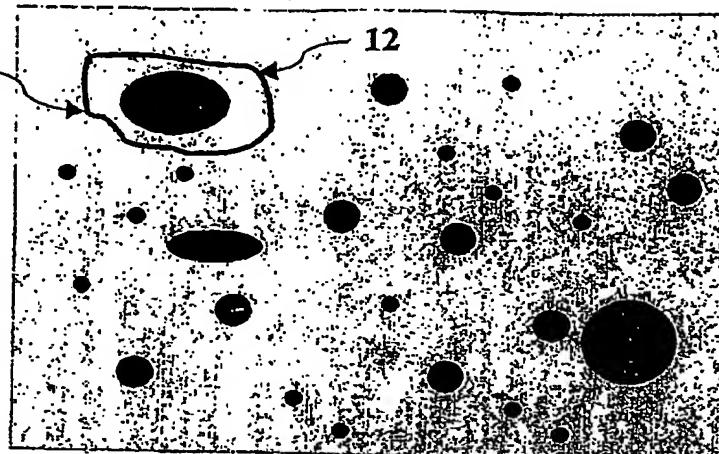
SUBSTITUTE SHEET (RULE 26)

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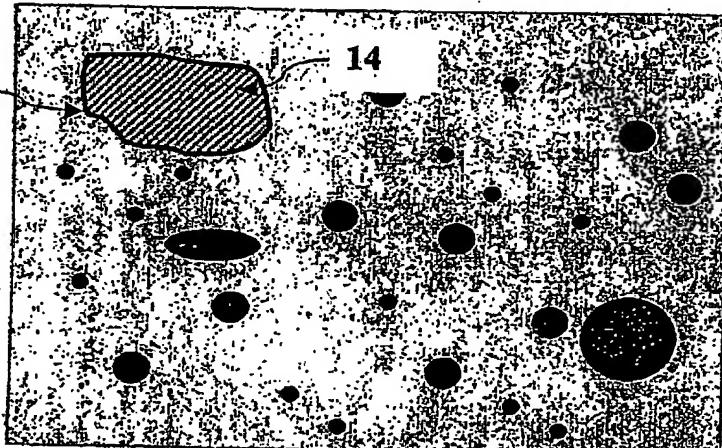
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Figure 6: Interactive ROI selection.

User defined
contour



Automatically
associated
region (pixels)



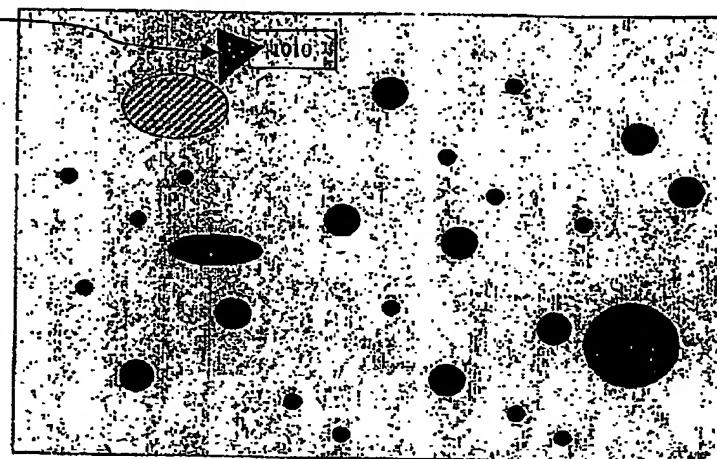
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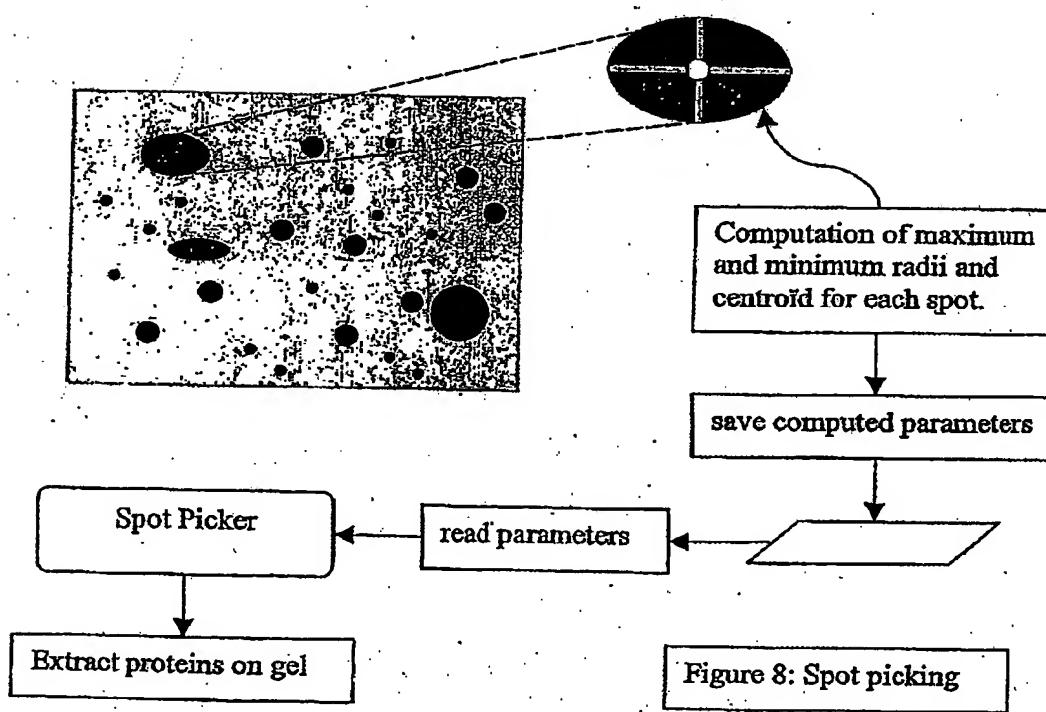
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Figure 7: Other visual indication of data association

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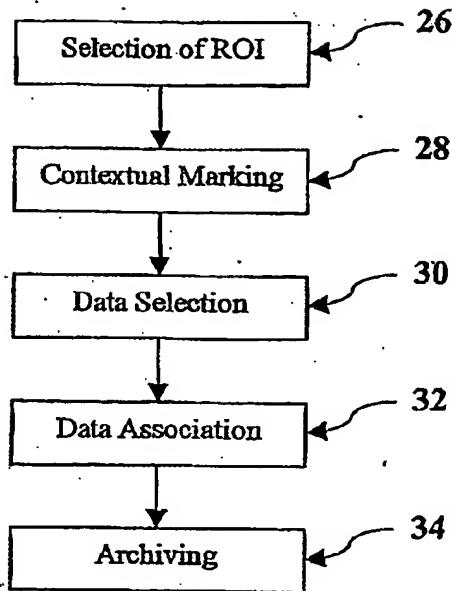


Figure 9: General flow of contextual data association

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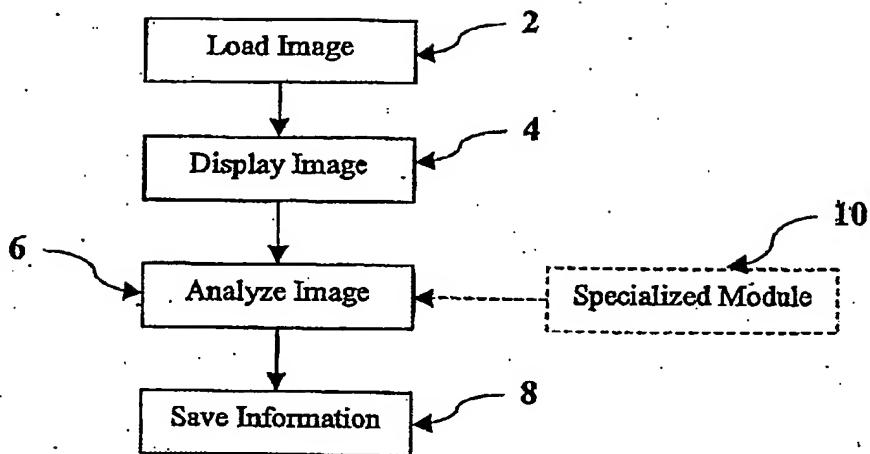


Figure 10: Basic image analysis Operational Flow

The screenshot shows a user interface for image data-mining. On the left is a dark, textured image of a medical scan, possibly a chest X-ray, with several white circular regions of interest highlighted. To the right is a table titled 'Discovered images' and a descriptive text box.

Discovered images		
Name	Location	Similarity
<u>Image 11</u>	//images	97%
<u>Image 93</u>	//images	94%
<u>Image 261</u>	//images	91%

Discovered images with possible pathology X (Signature X)

Click on image name to display image

Figure 11: Image data-mining and discovery results display in tabular form

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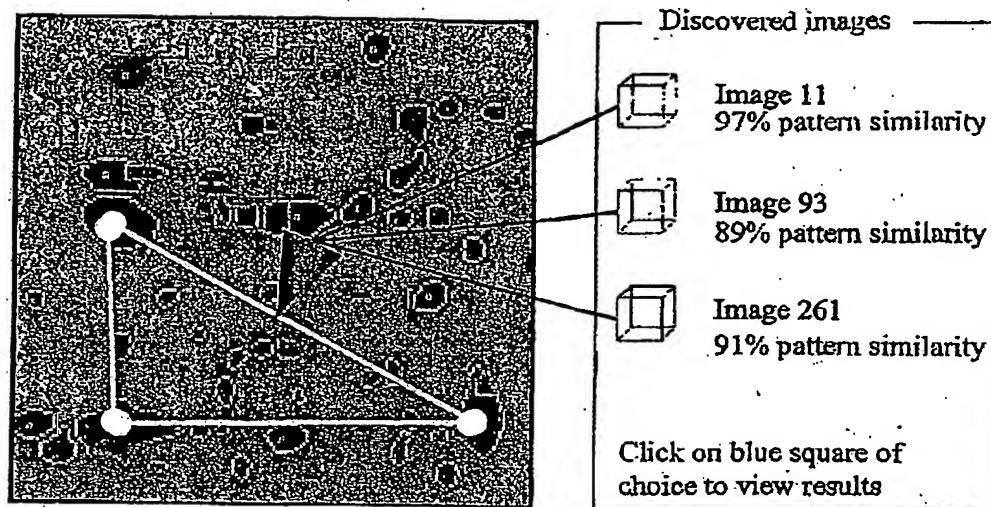


Figure 12: Image data-mining and discovery results display with visual associative links

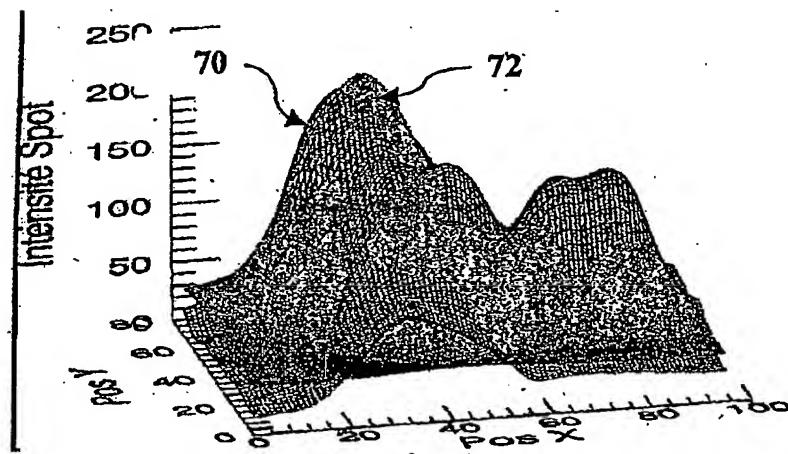


Figure 13: Simulated spots using diffusion functions

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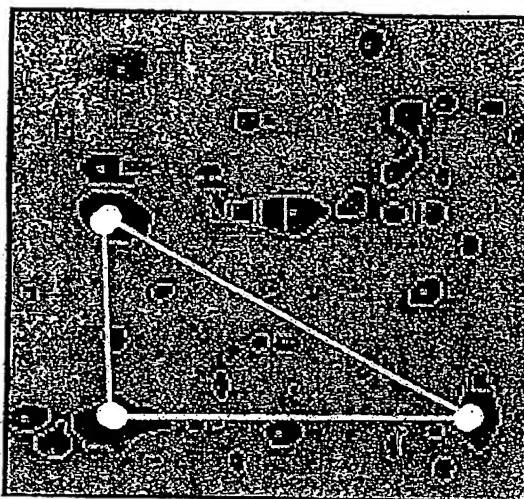


Figure 14: Example of multi-spot (protein) pattern

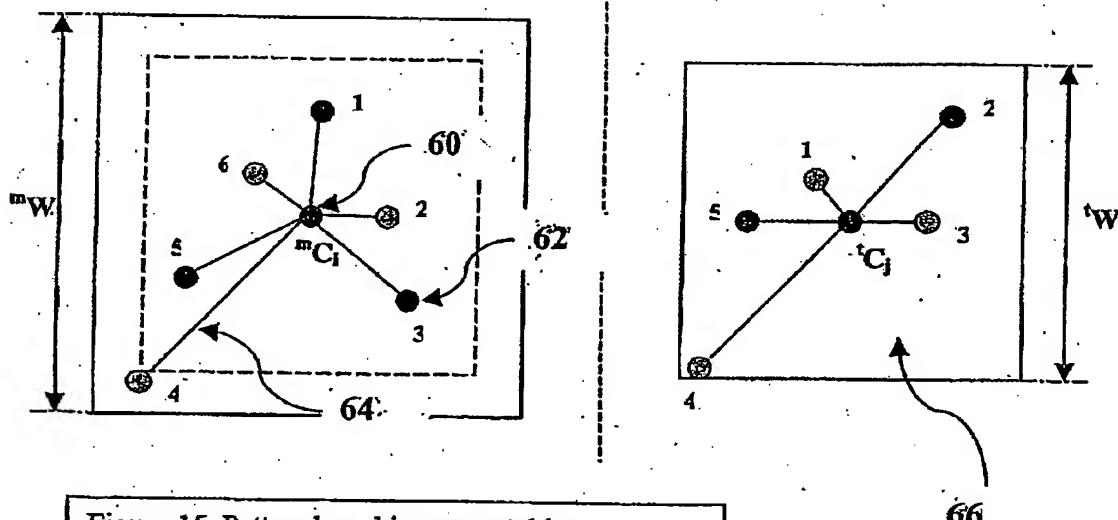


Figure 15: Pattern based image matching

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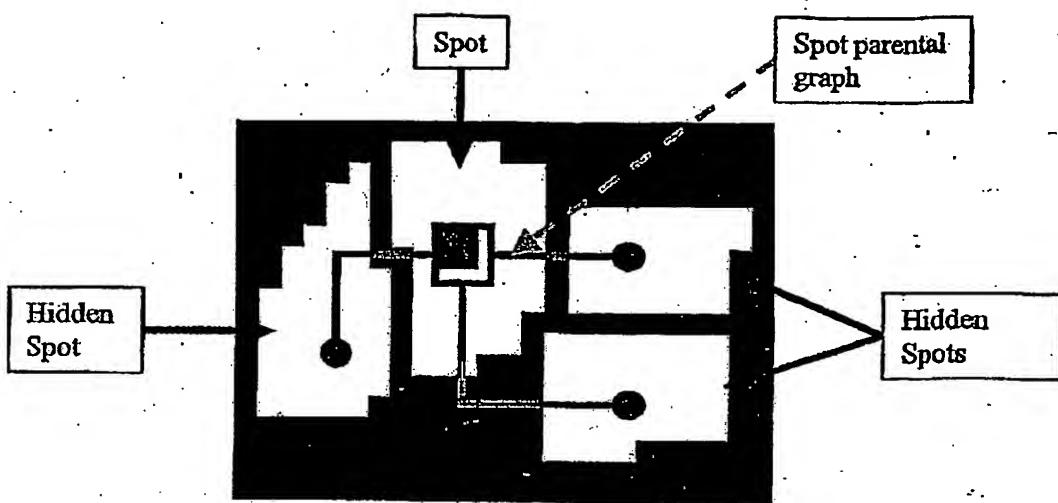


Figure 16: Hidden spot parental graph

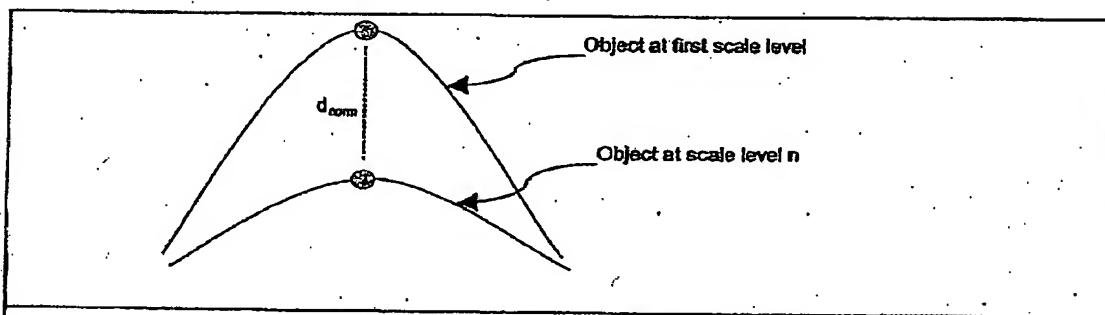
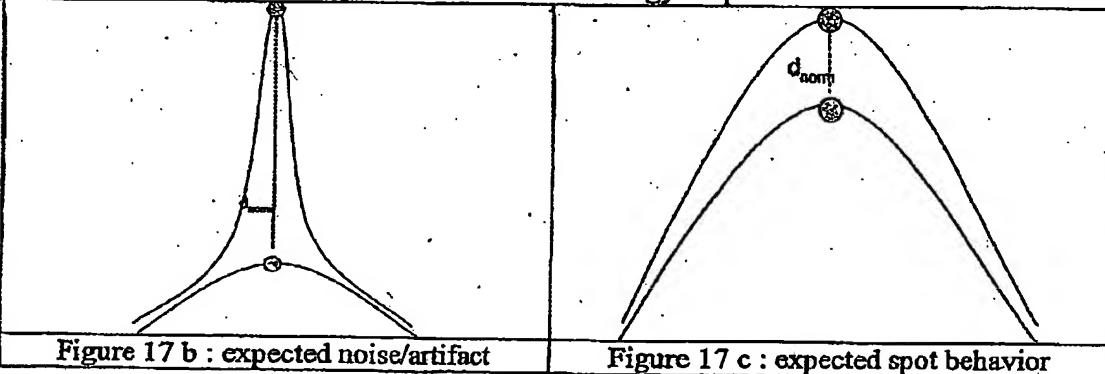


Figure 17 a: Two-scale energy amplitude



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behavior

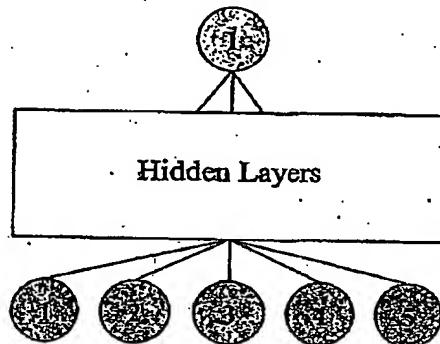


Figure 18: Simple Neural Network classifier

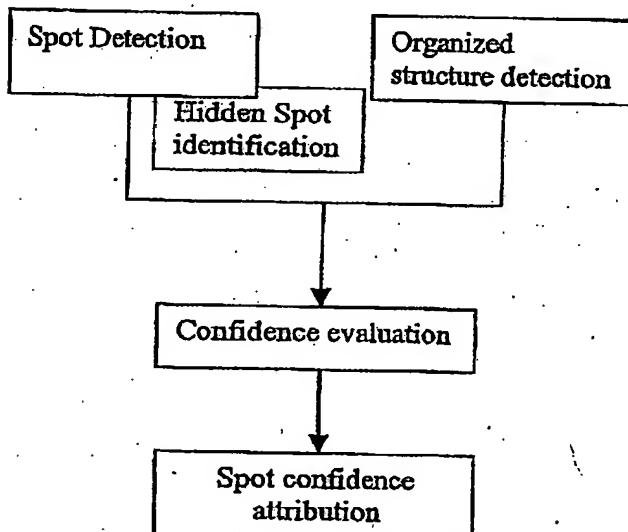
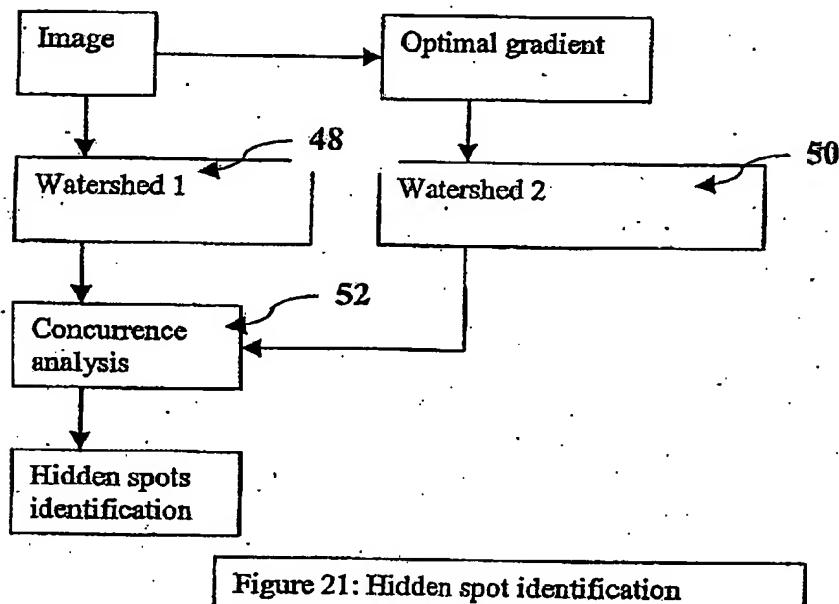
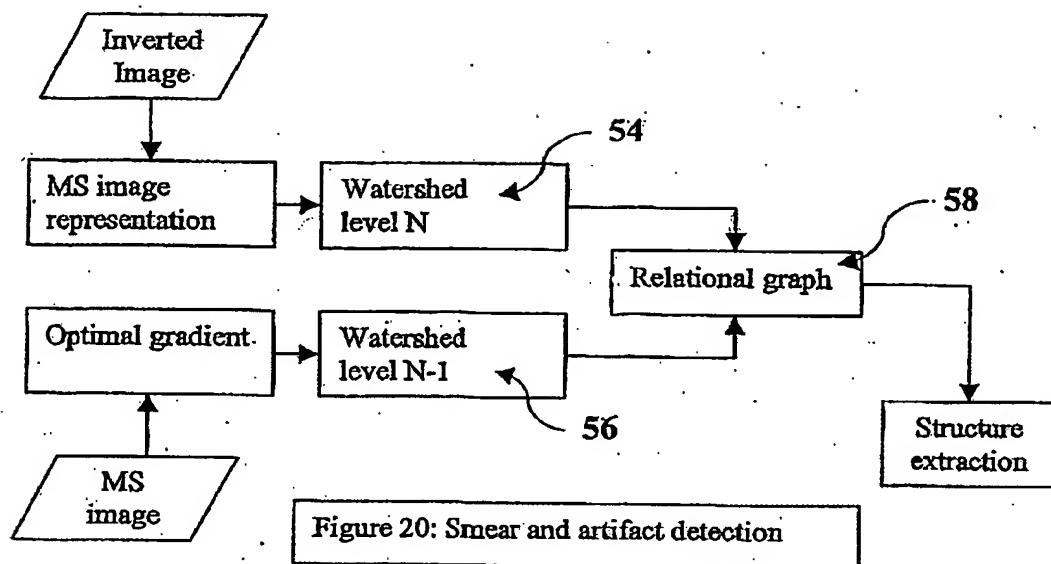


Figure 19: Spot confidence attribution process

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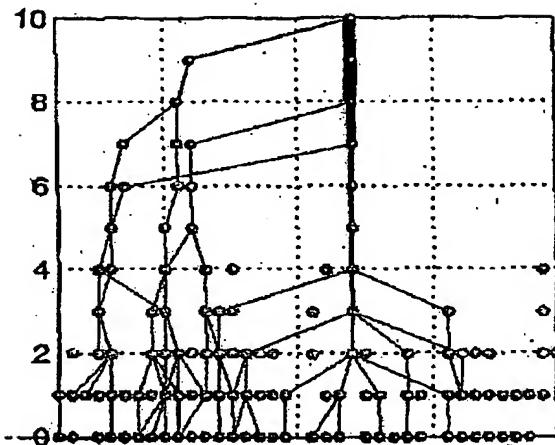
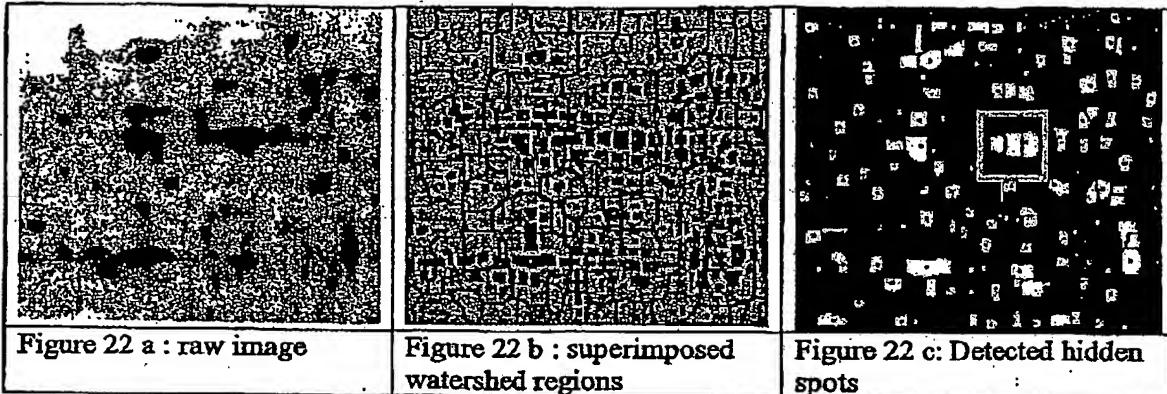


Figure 23: Profile view of Multiscale event tree

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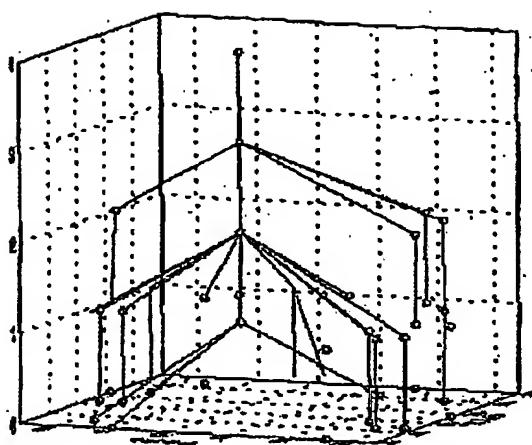


Figure 24: Typical 3D view of multiscale event tree of a spot

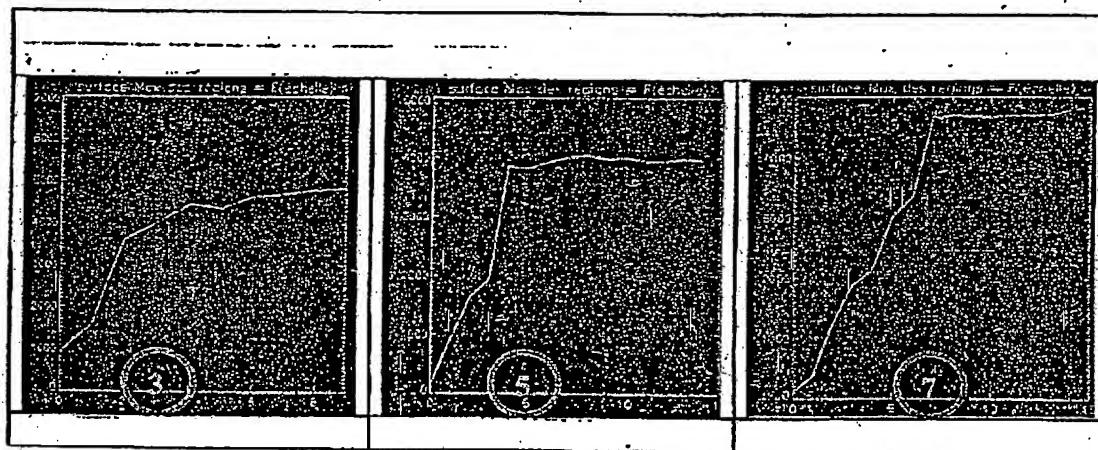


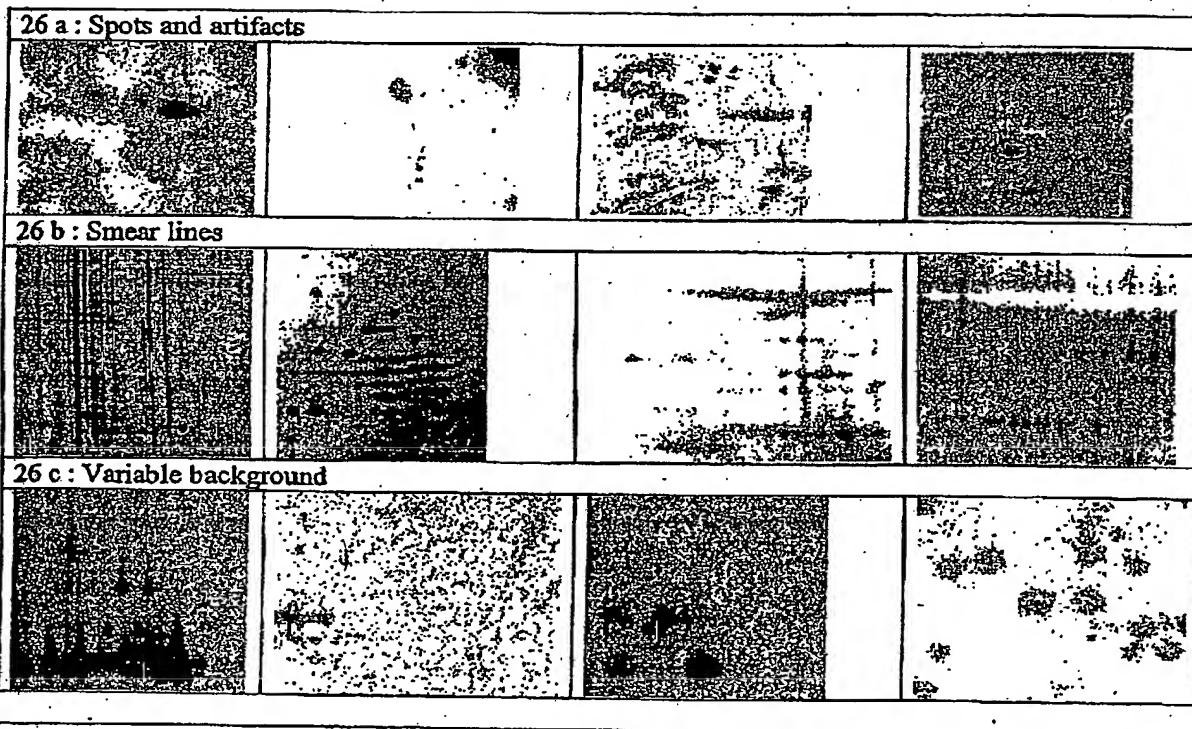
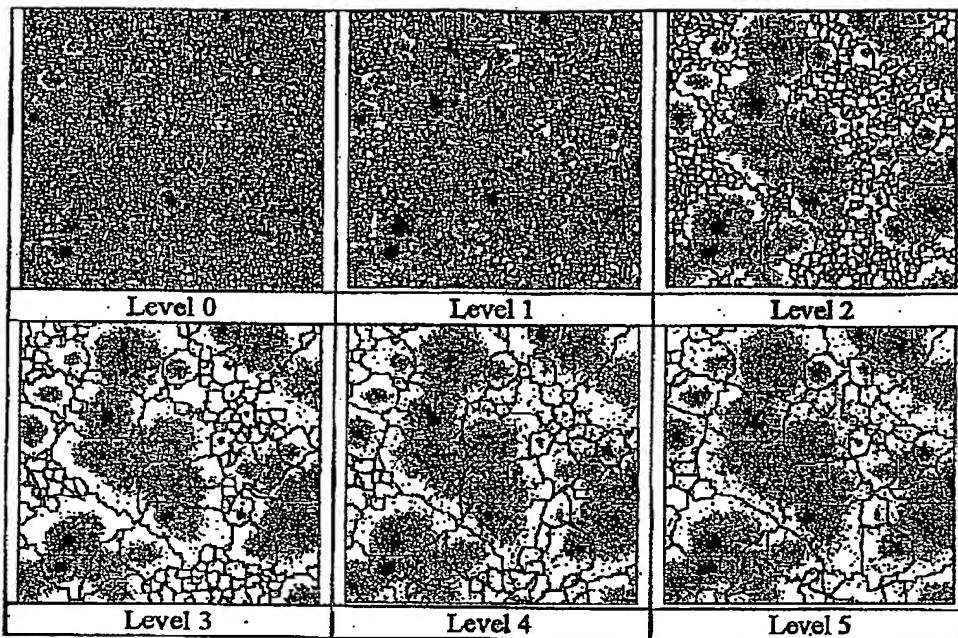
Figure 25 : Watershed regionalization of spot image at multiple scale levels
(multiscale image regionalization).

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Figure 26 : Typical image variations

Eq. 1 : Poisson distribution

$$P(x) = \frac{\mu^x e^{-\mu}}{x!}$$

Eq. 2 : Gaussian modeled spot

$G(\bar{x}, S) = \frac{1}{2\pi\sqrt{|S|}} \exp\left[-\frac{1}{2} \bar{x}^T S^{-1} \bar{x}\right]$, with $S = \begin{pmatrix} \sigma_x^2 & \rho\sigma_x\sigma_y \\ \rho\sigma_x\sigma_y & \sigma_y^2 \end{pmatrix}$, where rho represents the x,y correlation coefficient.

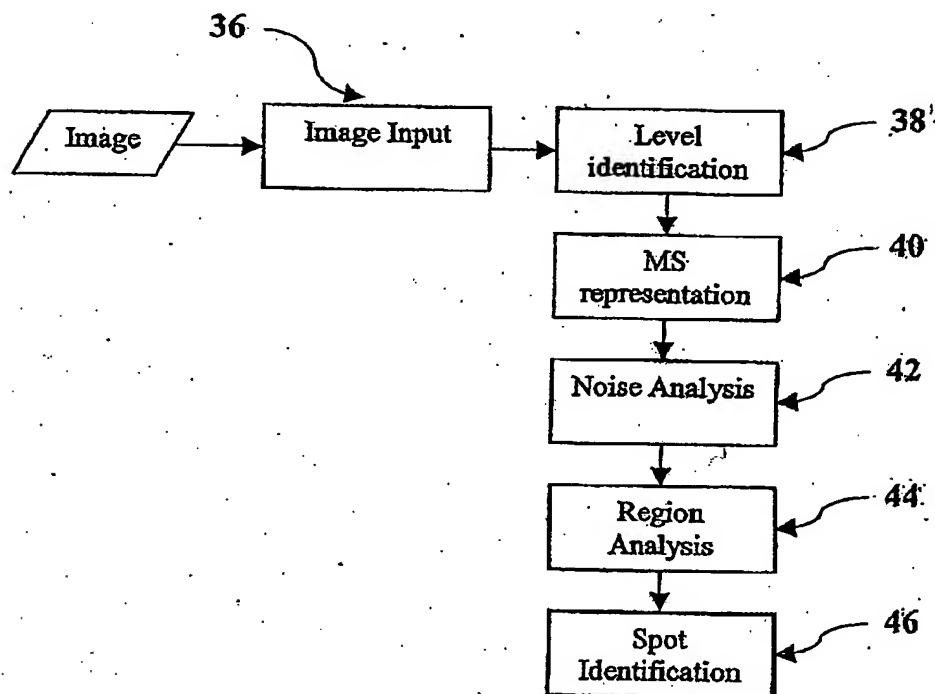


Figure 27: Overall spot identification process